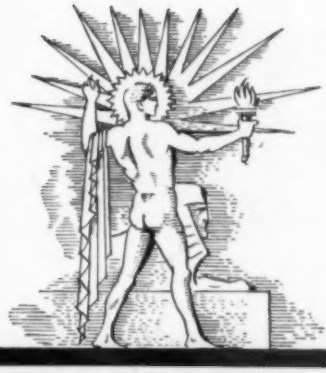
PRICE 15¢

PERIODICAL

PUBLIC LIBRARY
MAY 16 19[illegible]
DETROIT

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



May 14, 1938

Powerful

See Page 316

A SCIENCE SERVICE PUBLICATION

Do You Know?

The principal use for maple sugar today is in tobacco.

In country districts of China, bachelors and old maids are extremely rare.

German technicians report success in creating a heat-proof wool out of quartz.

Schools as well as towns are successfully managing forests on small areas of waste land.

Wires of molybdenum are being manufactured that are only one-third as thick as a human hair.

China is a young country as its people go—for many are born but few survive hazards of infancy and youth.

Tempered glass has gained commercial use only recently, but chemists were experimenting with it as early as 1875.

Farmers in California are being taught by agricultural extension workers how to make simple air cooling equipment for their homes.

In the Modoc War in the eighteen seventies, California Indians used to hide in lava tubes, which had once carried streams of molten lava.

By asking native Kentuckians how they pronounce words like chair, down, and mule, a professor of English is tracing origin of Kentucky's settlers from New England and other regions.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

ANTHROPOLOGY

Did the Mayas suffer from drought and grasshoppers? p. 314.

How large was the brain of Peking Man? p. 318.

BOTANY

What sort of plants grow best on farms without soil? p. 318.

ENGINEERING

Is automobile travel increasing? p. 316.

Why is glass used in road paving? p. 316.

EUGENICS

What are the arguments against compulsory sterilization of the biologically unfit? p. 316.

GENERAL SCIENCE—SOCIOLOGY

What organization will study the social relations of science? p. 318.

MEDICINE

Can the bleeding of hemophilia sufferers be checked? p. 311.

What drugs promise control of epilepsy? p. 312.

What medicinal value has Indian arrow poison? p. 312.

What new remedy has been found for pernicious anemia? p. 311.

PHOTOGRAPHY—ENGINEERING

How can the illusion of depth be given to cartoon movies? p. 321.

PHYSICS

How do scientists utilize the rays of the setting sun? p. 319.

How fast does a golf club travel as it hits the ball? p. 320.

Is solid matter empty? p. 315.

Is the universe expanding? p. 315.

What discovery may reduce the cost of X-ray treatments? p. 319.

PSYCHIATRY

Can mental disease be clearly attributed to gland defects? p. 317.

What effect do "pep pills" have on the mentally ill? p. 317.

RADIO

Can a horn be used to concentrate radio waves? p. 313.

ZOOLOGY—ENGINEERING

Can an electric eel light a lamp? p. 314.

The force of gravity varies in different parts of the world, increasing in general towards the poles.

Citing need of young children for regular dental care, New York dentists point out that 66 per cent. of two-year-olds have cavities.

Traffic in ancient Rome's streets consisted of such vehicles as chariots, family coaches, ox-carts, pack-mules, and litters borne by slaves.

No lost balls of ancient American ball games have ever been found in prehistoric ball courts in the Mayan region.

One village in northern China has specialized for 120 years in the business of hatching chicks artificially in earthenware jars.

More deer were killed by automobiles in a western New York county last year than hunters killed in a favored Adirondack deer county.

SCIENCE NEWS LETTER

Vol. 33 MAY 14, 1938 *No. 20*

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 2101 Constitution Avenue, Washington, D. C. *Edited by* WATSON DAVIS.

Subscriptions—$5.00 a year; two years $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

Members of the American Association for the Advancement of Science have privilege of subscribing to SCIENCE NEWS LETTER at the reduced price of $3 per year. Applications for this privilege should be accompanied by privilege card obtained from the Permanent Secretary, A.A.A.S., Smithsonian Institution Building, Washington, D. C.

In requesting change of address, please give your old address as well as the new one, at least two weeks before change is to become effective.

Copyright, 1938 by Science Service, Inc. Republication of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

Cable address: Scienserve, Washington.

Entered as second class matter at the postoffice at Washington, D. C., under the act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature and in the Engineering Index.

Advertising rates on application. Member Audit Bureau of Circulation.

SCIENCE SERVICE is the Institution for the Popularization of Science organized 1921 as a non-profit corporation, with trustees nominated by the National Academy of Sciences, the National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate and the journalistic profession.

Board of Trustees—*Honorary President*: William E. Ritter, University of California. Representing the American Association for the Advancement of Science, J. McKeen Cattell, Editor, Science, Garrison, N. Y.; Henry B. Ward, University of Illinois, Urbana, Ill.; Edwin G. Conklin, *President*, American Philosophical Society, Philadelphia, Pa. Representing the National Academy of Sciences, W. H. Howell, *Vice-President and Chairman of Executive Committee*, Johns Hopkins University, Baltimore, Md.; R. A. Millikan, Director, Norman Bridge Laboratory of Physics, California Institute of Technology, Pasadena, Calif.; Harlow Shapley, Director, Harvard College Observatory, Cambridge, Mass. Representing National Research Council; C. G. Abbot, Secretary, Smithsonian Institution, Washington, D. C.; Harrison E. Howe, Editor of Industrial and Engineering Chemistry, Washington, D. C.; Ross G. Harrison, Director, Osborn Zoological Laboratory, Yale University, New Haven, Conn. Representing Journalistic Profession, John H. Finley, Editor, New York Times; J. Edwin Murphy, Managing Editor, Baltimore Evening Sun, Baltimore, Md.; O. W. Riegel, Director, Lee School of Journalism, Washington and Lee University, Lexington, Va. Representing E. W. Scripps Estate, Harry L. Smithton, *Treasurer*, Cincinnati, Ohio; Warren S. Thompson, Miami University, Oxford, Ohio.

Staff—Director, Watson Davis; Writers: Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, Robert Potter, Ronald L. Ives, Leonard Engel; Correspondents in principal cities and centers of research. Photography: Fremont Davis; Librarian: Minna Gill; Sales and Advertising: Hallie Jenkins, Austin Winant, Howard Bandy.

MEDICINE

Yeast May Take Its Place With Liver in Treating Anemia

Physicians' Meeting Hears Also of Important Remedy For Hemophilia and New Method for Study of Blood

YEAST can cure pernicious anemia, as well as liver or dried stomach preparations.

Success in treating pernicious anemia patients with dehydrated yeast was reported by Dr. Maxwell M. Wintrobe of the Johns Hopkins Hospital at the meeting of the American Society for Clinical Investigation at Atlantic City.

Even more interesting to physicians than the discovery of a pernicious anemia remedy in yeast is the possibility this discovery holds that scientists may be able some day to identify the anti-anemia substance contained in liver and yeast.

The generally accepted theory now is that for normal blood formation in man, two factors are needed. One is an extrinsic factor derived from foods such as beef muscle. The other is an intrinsic factor secreted by the stomach. Lack of this latter factor is considered the cause of pernicious anemia.

No one has ever been able to identify either of these factors or to determine what the anti-anemic substance itself is. Yeast is a very complicated substance, but several important substances have already been isolated from it. These include vitamin B_1, riboflavin and nicotinic acid. It is hoped that further studies may lead to identification and isolation of the anti-anemic substance.

Another important angle of the research reported is the fact that it shows that anti-anemic factors are present in plant as well as animal tissues. This may explain why pernicious anemia does not occur in animals other than man. The anti-anemic substance may be so widely distributed and so readily available to other animals that they never fail to get enough of it to prevent pernicious anemia.

Remedy for Hemophilia

A powder from beef blood which stops dangerous bleeding in hemophilia was reported by Drs. Frederick J. Pohle and F. H. L. Taylor, of Harvard Medical School and Boston City Hospital.

The ever-present danger to a person suffering from hemophilia is the fact that his blood clots so slowly he may bleed to death from a small cut. The condition is hereditary, affecting only males but being transmitted through the mother.

The powdered substance from beef blood checked bleeding from external wounds and following tooth extractions in five hemophilia sufferers, Drs. Pohle and Taylor reported. The substance itself is a protein called globulin and was obtained from the fluid or plasma of beef blood. It is effective only when applied as a powder to the bleeding surface. It failed to hasten the clotting of the hemophiliac's blood when given by mouth, or to stop bleeding when used locally in solution.

This life-saving material, the scientists pointed out, is not yet available in large enough amounts for general distribution.

Pump Blood Through Corpses

Pumping blood through dead bodies sounds pretty gruesome, but two St. Louis scientists, Drs. John Russell Smith and William Bryan Kountz of Washington University School of Medicine, have found it a valuable means of learning more about causes of high blood pressure and the way diseases affect various organs of the body.

SCIENCE SERVICE TRUSTEES

The scientists and journalists who control the activities of Science Service, the institution for the popularization of science, met recently (April 28) in Washington for the annual meeting of the board of trustees. Left to right: Dr. Warren S. Thompson, Scripps Foundation for Research in Population Problems, Miami University; Dr. Harrison E. Howe, Editor, Industrial and Engineering Chemistry; Dr. J. McKeen Cattell, Editor, Science; Dr. Henry B. Ward, University of Illinois; Dr. Edwin G. Conklin, American Philosophical Society; Dr. W. H. Howell, Johns Hopkins University; O. W. Riegel, Director, Lee School of Journalism, Washington and Lee University. Watson Davis, Director, Science Service. Trustees not present for the picture are: Dr. C. G. Abbot, Secretary, Smithsonian Institution; Dr. John H. Finley, Editor, New York Times; Dr. Ross G. Harrison, Yale University; Dr. R. A. Millikan, California Institute of Technology; J. Edwin Murphy, Managing Editor, Baltimore Evening Sun; Dr. Harlow Shapley, Harvard College Observatory; Harry L. Smithton, E. W. Scripps Company, Cincinnati, Ohio.

High blood pressure probably has more than one cause, they learned from the cadaver studies. In these studies, specially prepared animal blood was run into the bodies by an artificial heart connected to the large artery in the chest.

Decrease in blood supply to the kidneys such as occurs in nephritis is sometimes responsible for high blood pressure, they found. Disturbance of salt balance of the blood tends to make the blood vessels more sensitive to the hormones which are normally present in the blood, and this also may be responsible for elevated blood pressures.

Study Gouty Families

A hereditary sign of gout may be found in members of gouty families even if these persons are not themselves afflicted with the family ailment, Drs. John H. Talbott and Frederick S. Coombs of Boston reported.

This sign is an increase in the amount of uric acid in the blood serum. This increase was found in 16 of 74 non-gouty members of gouty families. The condition was probably present at birth or shortly afterwards, the Boston physicians believe.

Whether these persons will develop gout later on cannot be determined but two of them are over 80 and have not had any acute gouty arthritis. This indicates, the doctors pointed out, that an increased amount of uric acid in the blood is "consistent with good health and a long life."

Science News Letter, May 14, 1938

ENGINEERING

"Tailor-Made" Flame Makes Oil Burners Fit

HEATING engineers have solved the problem of inefficient performance in old-fashioned furnaces converted for oil-burning. A new "tailor-made" flame, whose shape can be changed to fit any fire box is announced by the General Electric Company.

The conversion of old furnaces to oil heat brought convenience and freedom from dirt but the oil flame often gave inefficient performance because of lack of design coordination. Since the combustion chambers of furnaces cannot easily be altered in shape the only thing left to do was to make the flame shape adjustable to fit the furnace. Long, flat, round or pear-shaped flames can be obtained with the new equipment, it is claimed.

Science News Letter, May 14, 1938

MEDICINE

Epilepsy Soon to be Brought Under Medical Control

Study of Effects of New Drugs on Cats With Fits Is First Systematic Search for Remedies for This Disease

TWO new medical remedies for epilepsy, an operation for paralysis agitans, Indian arrow poison for the strange nervous disorder, athetosis, and an operation that could save over 500 babies annually, were reported by Dr. Tracy J. Putman of Boston at the Congress of American Physicians and Surgeons in Atlantic City.

It looks as if epilepsy, which has plagued mankind since prehistoric times and which Dr. Putman called the most important disease of the nervous system from the economic standpoint because of the disability it causes, will soon be brought under control by modern medicine and surgery.

On the medical side there are the two drugs reported by Dr. Putman. These are diphenyl hydantoin and benzophenone. The usefulness of these was discovered in the first systematic search ever made for remedies for epilepsy. Bromides and the modern sleeping potion, phenobarbital, which have been more or less successful in treating epilepsy, were first tried experimentally on human patients.

Dr. Putman and his associate at the neurological unit of Boston City Hospital, Dr. H. H. Merritt, found the new remedies by trying over one hundred drugs on cats that were having convulsions or fits like those of epilepsy. Diphenyl hydantoin, Dr. Putman said, is much more effective in controlling convulsions than phenobarbital, is less poisonous and does not put the cat or patient to sleep. The new remedies have been used for human patients but Dr. Putman is not yet ready to report these results.

Brain wave studies of epileptic patients, Dr. Putman said, suggest that there are probably several types of this ancient ailment, each due to a separate mechanism. Each kind may require individual treatment and study. Some cases of epilepsy can be helped by surgical operation to remove an irritable focus in the brain. Brain wave studies will, Dr. Putman believes, lead to better selection of patients who can be helped by this treatment.

Epilepsy is not the only nerve disease which is yielding to modern physicians and surgeons. The tremor and disability of paralysis agitans has been relieved in some patients by a brain operation in which certain nerves are cut.

A similar operation in which nerves in the spinal cord are cut has helped patients suffering from athetosis. This ailment incapacitates its victims because they have no nervous control over their muscles. It is characterized by strange, uncontrolled movements of arms and legs. Besides the operation described by Dr. Putman for this condition, he and his associates, Dr. P. Hoefer, and Dr. M. Burman of New York City have found they can help these patients by giving them curare, the old Indian arrow poison.

This drug depresses the abnormal movements for several days at a time. The difficulty is that the supply is limited. At present it must be obtained from South American Indians who only prepare it once a year, and the amount available is not uniformly potent. Search for more practical drugs of this type is now being made.

Between 500 and 800 babies in the United States can be saved each year by operation to relieve pressure on the brain, Dr. Putman estimated. These are among the 2,000 to 3,000 babies born every year with hydrocephalus or water on the brain as it is popularly known. Most of these infants are defective mentally and are doomed in any case, but about one-fourth of them are capable of growing up normally if the pressure can be relieved.

Science News Letter, May 14, 1938

The swastika design is found in metal-work in royal tombs of 2000 B. C. in Turkey.

A Danish academy of technical sciences is planned, to encourage research in such sciences and their application in Denmark's industry and trade.

RADIO "HORN"

Dr. Wilmer L. Barrow here adjusts the transmitter by which radio waves are started from the square hollow tube into the throat of the horn which can project them into space.

RADIO

New Type "Horn" Antenna Produces Sharper Radio Beams

Electromagnetic Device Acts as Acoustical Horns Do On Sound; May Be Useful in Micro-Ray Communication

A SIMPLE yet highly efficient method of producing a beam of ultra-high frequency radio waves, which may have widespread application in controlling "blind" airplane landings in fog, snow or rain, has been developed at the Massachusetts Institute of Technology by Prof. Wilmer L. Barrow.

The development may also have important uses in ship navigation and similar problems to which these short waves are adapted. This range of wavelengths, roughly less than a meter long, is the subject of intense study throughout the world these days in an effort to find still other uses.

Announcement of the advance was made by Dr. Barrow before a joint meeting of the Institute of Radio Engineers and the International Scientific Radio Union.

Major feature of the new method is a flared electromagnetic horn which is used as an "antenna" to project the waves into space much as acoustical horns concentrate sound waves into a beam. It holds particular promise of being useful in so-called micro-ray communication in which signals are sent over a narrow pencil-like beam at wavelengths only a tenth of a meter long. Several micro-ray communication channels have been in use in Europe for the past three or four years, the one across the English Channel probably being the best known.

In discussing application of the apparatus to hazardous blind airplane landings, Dr. Barrow said a further increase in the reliability and ruggedness of the sending and receiving apparatus is needed before the shorter waves can be used. Research is already under way on this problem at Technology under the sponsorship of the Bureau of Air Commerce.

Possibilities of radiating waves from electromagnetic horns were first described by Dr. Barrow two years ago in connection with the transmission of telegraph, telephone and television signals through the inside of hollow metal pipes. Development of the horns has now reached the state where it is possible to design them for particular applications with an engineering precision possibly greater than results for antennas of more conventional construction.

Can't Double Back

A major reason for this high agreement between calculations and experiment is that the waves, starting from a small rod in the throat of the horn, are forced to follow the guiding surfaces of the horn straight out into space and cannot easily double back on wires and other apparatus to be radiated in unintended directions. The beam is exceptionally clean-cut and regular.

The present shape of the horn has a rectangular cross-section, which permits delicate control of the sharpness of the beam in the two directions at right angles to its length by varying the flares of the two sets of opposite sides. Thus it is possible to send out a fan-shaped beam that is broad in one plane and narrow in another. A cigar-shaped beam can also be sent out through other variations in the shape of the horn, and other changes permit quick adaptation of the horn to numerous different problems, virtually impossible with older types of antennas.

Waves may be started in the horn by locating a small rod antenna only a few inches long directly in the throat or by connecting a hollow pipe carrying ultra-short waves so that it opens into the throat and pours the waves into it to broaden out into space.

In comparison with other directive antennas now in use, the new horn is very easy to operate since there is but one simple adjustment to make. It is also a very economical system, for the horn can be made from sheet copper or galvanized iron. Abolition of insulators contributes to efficient operation and relatively permanent mechanical strength.

Science News Letter, May 14, 1938

An old lady in Dalmatia, who threw a bunch of faded daisies in a corner and later observed hundreds of dead insects around the flowers, is credited with starting scientific interest in pyrethrum, valuable insecticide.

LIGHTS A LIGHT

This electric eel can light a neon light and make himself heard over a loud speaker.

ANTHROPOLOGY

Plagues of Locusts, Drought, May Have Driven Out Mayas

New Evidence Indicates Great Cities May Have Been Abandoned in Weariness Over Battling Plant Pests

PLAGUES of locusts, drought, and weeds may have combined to drive hordes of ancient American Mayas from their farms and beautiful stone cities, to seek a better land, long ago.

This is the conjecture of scientists, bent on explaining the rise and fall of America's greatest Indian civilization, in hope of learning more about patterns of civilization in general.

Under the program sponsored by the Carnegie Institution of Washington, botanists, biologists, astronomers, geologists and other specialized scientists are working with archaeologists to solve mysterious features of Mayan civilization, in the American tropics.

The Mayan farming system of planting corn in a field for several years, and then going on to another, fresher field, letting the first lie fallow for years, has long been regarded as wasteful. Yet, recent scientific studies cannot detect how the soil thus used is depleted in its fertility, although crops do bring less return each year, in such a field.

Dwindling food returns from the milpa system, as it was called, are believed closely linked with the Mayan exodus from entire cities and areas in tropical America.

Dr. Morris Steggerda of the Carnegie Institution staff suggests that these cities may have been vacated, in a march to new regions, when people grew worried over decreasing food, increasing labor of fighting weeds, plagues of locusts, and years of drought all combining against them.

How the important corn plant, staff of life to so many Indian tribes, was originally tamed for agriculture is another mystery. Botanists believe that Indian corn must have been developed in Central America or Mexico.

Science News Letter, May 14, 1938

ZOOLOGY—ENGINEERING

Electric Eel Lights Lamp, "Talks" Over Loudspeaker

A 500-VOLT, 50-watt eel electrified an audience of scientists by lighting a neon lamp, "talking" over a loudspeaker and otherwise putting on an electrifying display at the "command" of its exhibitors, Christopher W. Coates of the New York Aquarium and Richard T. Cox of New York University.

Brought to Washington for the International Scientific Radio Union and the Institute of Radio Engineers' joint meeting, the eel, a young and healthy specimen of the electric eel which inhabits the shallow fresh waters of South America, was put through its paces while connected with a cathode ray oscillograph so that visitors could see for themselves the nature of the powerful electric charge it can generate.

It lighted a two-watt neon lamp when one of its demonstrators irritated it by putting his finger in its mouth. Connected to outside circuits by three metallic "garters" slipped around its body, the eel sent a modifying current through a loudspeaker system so that it could be "heard."

The eel demonstrated by the New York scientists is more than four feet long and weighs 10 pounds. "When excited," they declared, "the eel gives a train of direct current pulses, each lasting .002 seconds, running along the electric organs from head to tail at a speed of the order of one kilometer per second. On open circuit the discharge may reach a repeatable peak voltage of 500."

Science News Letter, May 14, 1938

AERONAUTICS—MEDICINE

Air Commerce Bureau Will Study Aviation Medicine

RESEARCH workers of the Air Commerce Bureau will commence the systematic study of aviation medical problems on completion of specially designed and constructed quarters at Kansas City, Mo.

A supervising flight surgeon will head the staff of four which will man the station in studies of pilot fatigue, effects of oxygen lack on aviators and creation of new standards of physical fitness for airmen.

Science News Letter, May 14, 1938

Freight trains averaged higher running speed in 1937 than ever before.

PHYSICS

New Heavy Charged Particle Fits Into Present Theories

Leading Physicists Meet to Discuss Theories of Nature of Universe; Composition of Stars Described

THE recent discovery of the now-famous X particles in cosmic radiation has done much to clear up existing theories on the nature of the rays, said Dr. Carl D. Anderson, Nobel Prize winning physicist from the California Institute of Technology, before Notre Dame's symposium on the universe and primordial particles.

The symposium brought together some of the most famous men of science to discuss basic questions on the nature of the universe and what is in it. Besides Dr. Anderson, the program included such men as Profs. M. S. Vallarta, J. F. Carlson, Arthur H. Compton, Harlow Shapley, Gregory Breit, Canon Georges Lemaitre, William D. Harkins, Eugene Guth and Arthur E. Haas.

Recent studies, said Dr. Anderson, have shown that a great majority of the effects of cosmic radiation which are observed in the earth's atmosphere, can be explained by assuming that they are caused by electrified particles; either units of positive charge (the protons) or smaller particles (the electrons) having either positive or negative charge.

Until the discovery of the X particle which has a mass intermediate between protons and electrons, said Dr. Anderson, there were difficulties in explaining all cosmic ray observations by assuming positive charged particles as the entire causative agent. These difficulties may be resolved, however, by postulating the existence of new particles (the X particles) which have unit positive or negative charge and an intermediate mass.

Dr. Anderson traced the discovery of this important particle which fits, admirably, into the present picture of cosmic rays and the structure of matter.

Theory Still Good

No present astronomical observations really justify the abandonment of the "expanding universe" theory of cosmology, said Canon Georges Lemaitre in defending his hypothesis on the structure of the universe.

Canon Lemaitre, distinguished astrophysicist from the University of Louvain, Belgium, who is now visiting professor at Notre Dame, said that the observations of such astronomers as Prof. Edwin C. Hubble at Mt. Wilson Observatory contain experimental errors which are sufficiently great to rule out—as yet—any implications that some new hypothesis of universe structure must be found to replace that of the expanding universe.

Magnetic Field a Barrier

The magnetic field surrounding the earth acts as a great barrier wall to many cosmic rays seeking to pierce the atmosphere to the surface, said Prof. Manuel S. Vallarta of Massachusetts Institute of Technology.

At any given point on the earth, a particle of a given energy may only arrive from certain regions of the sky, Prof. Vallarta declared, due to the twisting effect of the earth's magnetic field on charged particles. By mathematics it is possible to work out, for any given point on the earth, a complicated cone through which particles of a given energy can pass; and also another cone in which similar particles cannot enter.

These mathematical determinations can be checked by experiments tracing the paths of primary cosmic rays. So complex are the mathematics of the equations of motion that human minds cannot integrate the differential equations employed. The giant robot calculating machine, developed by Prof. Vannevar Bush at M. I. T., was set to work on the problem and did the job. The differential analyzer, as it is called, "has played a very important role in these investigations," said Prof. Vallarta in describing the work.

Conclusions deduced from the theory indicate that apparently most of the primary cosmic rays are electrically charged particles and that at least three out of four of them possess a positive electrical charge.

Matter and Radiation Interchange

The swift and multiple changing of matter into radiation and back again was also described at the symposium by Prof. J. F. Carlson of Purdue University.

If it is assumed that cosmic rays consist of a mixture of electrons, positrons and gamma-rays with large energies, said Prof. Carlson, it follows from theory that the electrons and positrons, in their passage through matter, will produce high energy gamma rays by radiation when they pass nuclei of atoms. Thus material particles create radiation.

In contrast the gamma rays will lose energy in the nuclear fields of atoms and create pairs of electrons—positive and negatively charged. Here is the creation of material matter out of radiation.

If the original primary cosmic ray particle has sufficient energy this interchange of matter into radiation, and back again, may be repeated many times until several hundred particles appear finally.

The new-found X particle, or heavy electron which weighs a hundred or more times as much as an ordinary electron, is necessary in the theory, said Prof. Carlson, to explain some of the observations in cosmic rays made at the earth's surface. These heavier particles have greater penetrating power than other cosmic ray particles.

Even Solid Is Empty

An electron would have to pass through a block of solid beryllium 20 miles thick before it would—by chance—strike an atom. This new picture of the emptiness of solid matter was presented in calculations reported by Prof. Eugene Guth of the University of Notre Dame.

On the same program Prof. Arthur Haas, Viennese theoretical physicist now on the Notre Dame faculty, said that the entire universe was built up out of only three kinds of matter. Two of these three primordial particles are heavy (neutrons and protons) in comparison with the third type (the electrons).

Prof. William D. Harkins, University of Chicago, reported that "the composition of the stars is about what it should be if they began their existence a hundred billion years ago as bodies of hydrogen alone, provided there has been some process which has been able to produce the great amount of neutronic matter essential for the building of heavier atoms."

Of the six different possible kinds of matter which may exist in distant metagalactic space, modern astronomy has positive knowledge of the existence of only two kinds, (*Turn to Page 320*)

ENGINEERING

Use of Glass Fabric As Road Reinforcer Patented

A PATENT has been granted to one of America's most prolific inventors for a method of reinforcing asphalt highways by the use of spun glass fabric base.

Carleton Ellis of Monclair, N. J., who already has more than 700 patents to his credit and is second only to the late Thomas A. Edison in the number of patents granted him, received Patent No. 2,115,667 for his novel reinforcing method.

Strips of spun glass fabric or of fabric made from similar materials will increase resistance to wear and decrease maintenance cost of asphalt roads if included as a binder, Mr. Ellis declares in the specifications accompanying his patent. He proposes use of the glass fabric in the form of a criss-cross tape or as a cloth.

Cracking from cold and chipping at the edges of cracks are markedly reduced by incorporation of the flexible glass filler, he maintains. The fabric also serves to decrease the flow of soft asphalt on extremely warm days.

Science News Letter, May 14, 1938

EUGENICS

Sterilization Opposed As Way of Bettering Humanity

PEOPLING the earth with more intelligent, more effective and more socially useful human beings is one of the aims of science. One of the devices suggested for weeding out the defectives is sterilization, practiced in such politically diverse countries as Germany, Denmark and the United States.

The argument for controlled breeding among human beings arises in large measure from the success of biological measures which have led to improved kinds of horses, cows, pigs, dogs and other domestic animals.

But there are those working in science who believe that our present knowledge of human heredity is too scanty to justify too radical action. Prof. J. B. S. Haldane, one of the most brilliant of British biologists, is one of them and his new book, "Heredity and Politics" (Norton) is an exposition of the principles of genetics applied to human problems.

He regards compulsory sterilization "as a piece of crude Americanism like the complete prohibition of alcoholic beverages." Two strong objections to sterilization cited by Prof. Haldane are the danger of the operation necessary in women and the fact that the demand for sterilization is a symptom of a state of mind that can have unfortunate social consequences.

Sterilization in men is no more dangerous than the extraction of a tooth but in women it is like an appendectomy under favorable circumstances with a probable loss of life of one per cent or less.

The tendency to apply sterilization to those economically not self-sufficient or to those mentally deficient does not appeal to Prof. Haldane as the way to handle these problems. Segregation of mental defectives would answer the biological needs and in his opinion still fulfill our human duty to help and care for the weak.

Science News Letter, May 14, 1938

ARCHAEOLOGY

Did Ancient America Have Its Own Old Stone Age?

POSSIBILITY that ancient America had an "Old Stone Age" is raised again, with the discovery in New Mexico of crude stone axes strangely resembling handiwork of Europe's primitive Old Stone Age men.

That the unknown Americans, who made the crude implements, were not necessarily as ancient as Europeans of similar culture is plainly stated by Dr. Kirk Bryan of Harvard University, who found a number of the tools in an old quarry in Rio Arriba county.

Discussing significance of the prehistoric tools (*Science*, April 15), Dr. Bryan also says that no direct relationship with European types is implied. The tools do, however, represent a heretofore unrecognized type of ancient inhabitant of this continent, possibly preceding known Indian tribes.

Science News Letter, May 14, 1938

ENGINEERING

Giant Electric Pumps Lift Water Over Mountains

See Front Cover

THE 12,000-horsepower motor pictured on the front cover of this week's SCIENCE NEWS LETTER is one of six which will drive some of the world's largest pumps. Each high-speed centrifugal pump will lift about 200 cubic feet of water a second over the mountains to Southern California. They are being built by Westinghouse.

Science News Letter, May 14, 1938

IN SCIENC

ENGINEERING

Travel Less Although Motorists Drive More

ADD this to your list of paradoxes. California motorists burned 87,000,000 gallons more gasoline in their cars during 1937 than they did in 1936, but they traveled less!

What happened, reports Victor W. Killick, chief, Bureau of Statistics of the California Department of Motor Vehicles, is that more motorists consumed a greater total gallonage of gasoline, but individually they travelled less on the average. Thus there was a reduced gasoline consumption per registered vehicle in 1937 compared with the preceding year.

While the decrease was not large per car, it mounts to a large total when multiplied by California's 2,500,000 vehicles. In bulk the decrease means that for California 500,000,000 gallons of gasoline was *not* consumed in 1937 which might have been used had the average motorist traveled as far as he did in 1936.

California has two motor cars for every five persons in the state. The point of saturation for motor vehicles, states Mr. Killick, has nearly or actually been reached.

This saturation has been attained not so much because Californians cannot buy more cars if they wish, but because many motorists feel that driving their cars is often more trouble than it is worth. Increasing traffic accidents are keeping others, through fear, from much driving.

If California is a sample of what may generally become the case throughout the country, Mr. Killick foresees a serious setback to business. He estimates that the automotive and the allied industries are so ramified that at least 25 per cent. of the nation's population will be adversely affected by curtailment of automobile sales and travel. What part tourist travel played in the situation in California is not given by Mr. Killick, for these cars are not registered in the state.

Science News Letter, May 14, 1938

NCE FIELDS

MEDICINE

Endocreme Maker Brings Suit Against the A. M. A.

A SUIT charging conspiracy and libel and asking $1,000,000 damages has been brought against the American Medical Association and Dr. Morris Fishbein, Editor of the Journal of the American Medical Association, by Hirestra Laboratories, Inc. of New York, manufacturers of Endocreme, a face cream used by women. Papers were served in Elmira, N. Y., on Dr. Arthur W. Booth, chairman of the board of trustees of the American Medical Association, April 21 and the suit filed in the Supreme Court of New York County, April 22. Max D. Steuer is attorney for the plaintiff.

It is charged in the complaint that the American Medical Association, Dr. Fishbein "and others" entered into a conspiracy "for the purpose of maliciously injuring and destroying the plaintiff's business, good will, reputation, credit and property."

The action is the result of alleged derogatory statements made by the defendants concerning Endocreme, the publication in the Journal of the American Medical Association of a condemnatory editorial and release to the press of an abstract of the editorial. (*SNL, April 23.*)

The plaintiff charges that Dr. Fishbein and the Journal singled out the product, Endocreme, for attack without having examined it; that they ignored medical testimony bearing on the use of estrogenic compounds, including estradiol, the active ingredient in Endocreme, and their beneficial effects in the treatment of women; and that the charges made by the defendants are false and were known by the authors to be false.

It is stated that estradiol has been in medical use for many years.

The complaint charges that the experiment on rats reported in the press release and the Journal's editorial, afforded no reasonable basis upon which an inference might properly and reasonably be made as to the effect of Endocreme on women; that the defendants know that in the cited experiment the dosage of estradiol administered to the rats was 52 to 546 times the physiological requirements and that if similar proportionate amounts were used by a woman in the application of Endocreme it would require, so as to make a proper comparison, 5,000 times the amount definitely recommended by the plaintiff, or 5,000 jars of the cosmetic a month.

It was known to the defendants, the complaint says, that tests made on rats were not accepted by medical authorities as indicative of the effect of Endocreme on humans.

The defendants, the complaint says, knew that clinical and other tests had been conducted at great length upon human beings with estradiol and other estrogenic compounds over a period of many years and that in no written published medical literature had the claim ever been made that such estrogenic compound, including estradiol, ever caused cancer in a human being.

Science News Letter, May 14, 1938

MEDICINE

Sulfanilamide Can Aid In Diagnosing Undulant Fever

SULFANILAMIDE, the chemical remedy which is on everyone's tongue figuratively if not literally, since it is finding such wide medical use, now promises to help diagnosis of and recovery from undulant fever. This is the troublesome and serious illness, long-drawn-out and with many relapses, that comes from drinking milk infected with germs known as Brucella organisms.

The discovery that sulfanilamide could help in this illness was made by chance, Drs. Henry Welch, John A. Wentworth and Friend Lee Mickle of the Connecticut State Department of Health reported to the American Association of Immunologists.

The chemical causes an increased ability of the undulant fever patient's white blood cells to eat up the Brucella organisms. This should help to speed recovery.

This activity of the white blood cells is specific for these particular germs alone, the Connecticut scientists found. Sulfanilamide caused no such increase in their ability to attack other germs with the exception of certain streptococci and staphylococci which are so widely distributed that most persons have probably developed some immunity or resistance to them.

Science News Letter, May 14, 1938

PSYCHIATRY

Role of Glands in Mental Disease Is Still a Puzzle

ONE OF the most puzzling problems faced by the scientist exploring man's mind is the role played by the powerful glands of the human body.

A matter of demonstrated fact is the knowledge that these glands serve as chemical factories, pouring out potent substances capable of changing the whole behavior of the individual. Presence or lack of a glandular chemical may make a person energetic or lazy, submissive or rebellious, mentally alert or stupid.

That the endoctrine glands occupy a place of power in determining the mental soundness or illness of the individual has long been suspected by physicians and psychologists. Glandular disorders have been noted in the mentally ill and to some this has meant that the glands could be blamed for the mental illness. Others, reversing the relationship, see the emotional strains of mental disease as effective in throwing the endocrine system out of balance.

Actually, medical science today has no crucial evidence of any cause and effect relationship between the powerful glands of internal secretion and mental disease or mental deficiency, Dr. Hugh T. Carmichael, psychiatrist of the University of Chicago Medical School, told his colleagues at the recent meeting of the American Association for the Advancement of Science.

A recent survey showed that of a group of about 300 mental patients selected for endocrine diagnosis and treatment more than a third were so improved that they were able to leave the institution. But do not jump to the conclusion that it was gland treatment that saved them. Further analysis showed only 17 per cent of those selected for endocrine diagnosis actually had anything wrong with their glands and less than half of these had adequate gland treatment. In addition many of those "cured" had had a type of mental disease that often disappears spontaneously.

Mental disease and mental deficiencies are common. So also are glandular imbalances. That they are often found in the same individual could be simply a matter of chance.

The role of the endocrines is still an unsolved problem and presents a fruitful field for future research.

Science News Letter, May 14, 1938

BOTANY

"Hydroponic" Soilless Farm Created on Wake Island

WAKE Island, tiny dot of coral far out in the Pacific, is to be the site of the newest soilless "farm" for growing green vegetables according to the system originated by Dr. W. F. Gericke of the University of California. With a total surface area of only half an acre, it is expected to supply the table needs of passengers and crews of trans-Pacific clipper planes that use Wake as a way station on the long flight.

The "farm" will consist of a series of shallow tanks, now rapidly being installed. These will be filled with water in which mineral fertilizer salts are dissolved in the right concentration to feed green plants. Over the tops of the tanks wire netting will be stretched, on which, supported in sawdust, excelsior, or other suitable material, tomatoes, peas, beans, carrots, and other vegetables will grow, drawing their water and mineral nutrients out of the tanks in which their roots will be dangling.

Wake Island will represent the westernmost extension of Dr. Gericke's system of soilless farming, or "hydroponics." Similar set-ups of tanks for growing vegetables and flowers have been established under his supervision at a number of places along the Pacific coast of the United States, and recently the system has been extended to the eastern part of the country. Dr. Gericke has just returned from an inspection visit to hydroponic "farms" in the East. He states that a number of European governments have expressed lively interest in his method of growing crops without soil.

Extensive experiments have been carried out with a large variety of economic plants, even including a full-sized banana tree. Results indicate that for the present at least profits cannot be expected from crops consisting of dry seeds, like wheat and other grains, particularly when these also depend for their value on high protein content. It appears more profitable to raise plants in the fresh vegetable class, which have high water content and are valued mainly for carbohydrates, vitamins, attractive flavor, and mineral salts. Tomatoes have thus far proved the most successful of hydroponic crops.

The system is used either in greenhouses, or out of doors where the climate of the growing season is favorable. In the continuously mild tropical climate of Wake Island, cultivation will be carried on entirely in the open.

Science News Letter, May 14, 1938

ANTHROPOLOGY

Brain of Peking Man Shows Many Apelike Features

CASTS made of the space once occupied by the brain, in the skulls of half-million-year-old Peking Man, show many remarkable apelike features, despite the indubitable fact that this Oldest Inhabitant was definitely human. Some of these features were described by Dr. Franz Weidenreich, leader of excavation work in the Choukoutien caves near Peiping, in the annual James Arthur Lecture, at the American Museum of Natural History.

Although the total volume of Peping Man's skull space is definitely in the human range and far above that of the apes, the distribution of that space is not in accordance with present-day specifications, Dr. Weidenreich disclosed. The arch of the cranium is very low, and the greatest breadth of the skull lies low and toward the rear. All of this minimizes the forebrain, usually considered to be the center of the higher, more intellectual part of the brain's activities.

Not only in bulk but also in detail was the forebrain of Peking Man less developed than that of modern human beings. The folds and furrows were fewer and simpler, more on the ape pattern than those of modern brains. Furthermore, the blood supply, traceable through the grooves in which the arteries fitted under the skullcap, was relatively scanty and not elaborately distributed. This again is an apelike character; modern human cranial arteries that serve the forebrain are much more abundant and elaborately developed.

The jaws and teeth of Peking Man were the subject of another discussion when Dr. Weidenreich and a group of his American co-workers held a round-table.

Peking Man's teeth, like his brain, are undoubtedly human, yet show some interestingly simian features. They are bigger and longer-rooted than modern human teeth, and there is no sign of reduction or degeneration in the wisdom teeth. The pattern of the grinding surfaces on the molars is complex, like that of ape teeth, in contrast to the relatively simple, cross-grooved pattern of teeth in modern man.

Of especial interest is the total absence of dental caries, traces of pyorrhea, and other symptoms of tooth troubles practically universal among present-day human beings and frequent even among more recent Stone Age races. Among the 148 teeth of Peking Man thus far found, not one is defective.

Science News Letter, May 14, 1938

GENERAL SCIENCE—SOCIOLOGY

Propose Society to Study Science's Social Impacts

A MOVEMENT looking toward the formation of a Society for the Study of the Social Relations of Science (S. R. S. it is proposed to call it for short) has been launched by an inquiry undertaken by the British science journal, *Nature* (April 23).

Born of a growing interest in the profound effects of science upon society, this new organization would first be formed in Great Britain and then in other great nations.

The idea of S. R. S. is discussed with general approval by 38 leading British men of science who received *Nature's* proposal in advance of publication.

Three definite trends were cited as leading up to the S. R. S. proposal: 1. Resolutions of the American Association for the Advancement of Science last December stressing the social relations of science. 2. The British Association's move of several years ago for the discussion of social problems which science had helped to create and might help to solve. 3. Action by the International Council of Scientific Unions,

which set up a committee on science and social relations last year charged with preparing a report to be issued in 1940.

As visualized by its proponents, S. R. S. would have individual membership not confined to scientists but dominated by them. It would receive, read, discuss, and, after consideration by suitable referees, publish papers submitted to it. It would not in general express group opinions, but leave readers to accept or reject the statements in its publications. It would be a society for the advancement of knowledge, not a propagandist body.

H. G. Wells, Sir William Bragg, president of the Royal Society, Sir F. Gowland Hopkins, Prof. J. B. S. Haldane, are among the 38 scientists who commented favorably on the S. R. S. proposal.

Science News Letter, May 14, 1938

PHYSICS

New X-Ray Tube Arrangement May Reduce Cost of Treatment

Mysterious Radiation From Helium Reported to the Physical Society; Sunset Rays Inform on Upper Air

A NEW and simple arrangement of X-ray tubes which may ultimately reduce the cost of X-ray treatment in cancer therapy was reported to the opening sessions of the American Physical Society by Dr. G. Failla, chief radiologist of the Memorial Cancer Hospital, New York City.

Chief merit of the new system is that it uses existing apparatus and yet eliminates certain parts so that the cost of a superior X-ray therapy installation is cut. Moreover, the "life" of the expensive X-ray tubes—costing $450 each—has been materially increased.

Dr. Failla, well-known American authority who has served on international committees on X-ray dosage standardization, told his fellow scientists that the key point in the new, cheap installation is the use of two X-ray tubes working on alternating current.

Part of the past expense of X-ray treatment has been the necessity of using rectifying tubes which turn the alternating current from high-voltage transformers into direct current for use in the tubes.

By the Failla setup alternating current is employed and each tube works on a "half-wave" of the cycle alternately. One tube is placed below the material, or patient, being radiated and the other tube above so that double the intensity is obtained. In tests a radiation intensity of 7,000 roentgens per minute has been obtained, as compared with the 50 roentgen per minute output of standard equipment.

"The surprising thing," said Dr. Failla, "is that the tube life with this arrangement is longer than usual. In the case of two such machines used at Memorial Hospital for routine treatment of patients, one of the tubes has been in actual operation for over 3,700 hours, and is still in good condition. This is an important item, considering that each tube costs about $450."

Cosmic Rays in Cavern

Deep Linville caverns in North Carolina have been the latest laboratory of cosmic ray scientists, it was reported.

Prof. Walter M. Nielsen, Duke University, and Dr. K. Z. Morgan of Lenoir-Rhyne College, have been carrying their instruments down into the cavern blackness measuring the intensity of the penetrating component of the rays, which pierced the overlying rock.

The important finding of the research was the discovery that the effects observed can be produced by a cosmic ray having the nature of an electrified particle, like an electron. It is not necessary to assume the transmission of cosmic radiation to great depths by an uncharged particle such as the postulated neutrino.

Sunset a Clue to Upper Air

The fleeting rays of the setting sun are being used by scientists to study the temperature of the atmosphere at heights far above any possible balloon ascension, it was reported by Dr. E. O. Hulburt of the Naval Research Laboratory, Washington, D. C.

Direct measurement of the earth's atmospheric temperature and pressure have been obtained up to heights of 13.8 miles (the National Geographic Society-U. S. Army Air Corps) in manned balloon ascensions. Unmanned, smaller balloons have reached about 19 miles, said Dr. Hulburt.

Searchlights have been used to probe air and their rays have been detected, photographically at night, up to heights of 17 miles. However, Dr. Hulburt indicated, exact values of atmospheric density have not been obtained beyond a height of 14 miles by this searchlight method.

By the new system sunlight is used. "As the sun sets the earth's shadow above the observer moves upward and the region of the atmosphere illuminated by the direct rays of the sun moves to high levels," said Dr. Hulburt in his report.

At dawn, the reverse sequence occurs and the sunlight starts from high altitudes and gradually works down to the surface of the earth. Both dawn and dusk measurements were employed in the research.

The study involved the measurement of the brightness of the zenith sky for about an hour after sunset and an hour before sunrise. From these brightness studies, plus the known intensity of sunlight and the laws of scattering of light by air, the density (or pressure) and the temperature of the atmosphere was determined.

The temperature, said Dr. Hulburt, came out to be between -50 and -80 degrees Fahrenheit, from 8 miles to about 35 miles above the earth's surface. No important changes in upper air temperatures were noted in tests running from October to April.

"It must be remembered," Dr. Hulburt concluded, "that the results refer only to the atmosphere during conditions of twilight in a temperature latitude (Washington, D. C.). One would expect that the upper air grew warmer during the day and cooler during the night. However, the day and night change may not be very great."

Mysterious Radiation Found

A new type of yet-unexplained, continuous radiation has been discovered in the spectrum of helium, it was reported by Prof. A. G. Shenstone of Princeton University.

Prof. Shenstone set out to study the spectrum of helium in an attempt to produce, in the laboratory, some of the

spectral lines found in the light of the sun's corona.

None of the sought-for-lines appeared, said the Princeton physicist, but—as so often happens in research—a new discovery was made. Prof. Shenstone passed an electric current through a chamber of helium gas and excited it until it gave off its characteristic pale blue-violet rays. Near the two electrodes of his discharge tube the usual and long-known line and band spectrums of helium were obtained.

However, his studies also disclosed the new continuous radiation almost on the surface of the positive electrode and also at a point about midway between the electrodes. By analyzing the radiation, Prof. Shenstone has shown that it extends continuously from the red colors into the ultraviolet region.

The new continuous spectrum has apparently no relation with the usual line, or band, spectrum of helium, says Prof. Shenstone. No accepted cause, which might explain its presence, has yet been worked out.

However, Prof. Shenstone suggests that the new radiation might be caused by the slowing down of the electrons, of the gas, as they approach the positive, or anode terminal. This is only a hypothesis, he added, however, which will require further study before acceptance.

Nitrogen Isotope "Plant"

A rare kind of sulfur, the isotope whose atoms are mass 34 instead of ordinary mass 32, has been concentrated by Dr. Harold C. Urey, Nobel chemist of Columbia University, in the latest of his separations of the different varieties of matter. H. G. Thode, John E. Gorman and Dr. Urey presented a joint paper announcing this latest achievement disentangling the isotopes.

Sulfur mass 34 has been concentrated threefold to 6.8 per cent. compared with 2.3 per cent. which is its frequency in natural sulfur.

In giant towers of glass at Columbia University, scientists are also tediously concentrating the rare isotope of nitrogen, having mass 15. Each day the large apparatus produces only a tiny drop of the rare nitrogen isotope, containing only 0.15 grams of material. Yet this rate is 100 times that of any other method.

Two columns of glass are used. One is 40 feet high and the other 25 feet high. A 46-fold increase in concentration of nitrogen 15 has been effected with the apparatus and a still greater tenfold increase is expected as soon as a third tower 50 feet tall is added to the other two units.

Streamlined Golf Club

Something new for golfer, a streamlined golf club, was described at the meeting by Dr. S. J. Crooker, consulting physicist. Dr. Crooker exhibited a "tear drop-shaped" club which has only one-fifteenth the air resistance of a club head of the orthodox shape.

Streamlining is vital in a golf club, Dr. Crooker indicated, because at impact the club head meets the ball with speeds of something like 125 miles an hour. At these airplane speeds the application of aerodynamics to the shape of the club head has the same merits as it does to the shape of a modern transport airplane.

In windtunnel tests the superiority of the new club to the older kind was strikingly apparent. A long-hitting pro golfer, like Jimmy Thomson, should be able to strike a ball and have it carry 275 yards before hitting the ground, said Dr. Crooker. To which golfing "duffers" in the audience of physicists at the meeting added, "Woe is me!"

Science News Letter, May 14, 1938

From Page 315

said Prof. Harlow Shapley, director of Harvard College Observatory.

The two kinds of matter positively identified are galaxies and radiation, said Dr. Shapley. A third kind, star clusters, is indicated by preliminary observations still in progress.

"Of isolated stars, meteoroids and gas, we have no evidence," he declared, "and can make only rather insecure inferences."

Metagalaxies are the most extreme galaxies known to astronomers. Metagalactic space is the most distant observable region of space which can be photographed on the largest astronomical telescopic camera.

Science News Letter, May 14, 1938

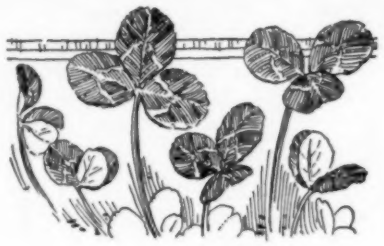
Piano wire is used in a soap factory to cut slabs of soap into small bars.

To relieve traffic congestion in Paris, a vehicular tunnel 2,700 feet long is being constructed.

Planting shrubs two or three feet away from a house allows space for painting or other work on the building when necessary.

AGRICULTURE

NATURE RAMBLINGS
by Frank Thone



New Kinds of Silage

GRASS, and legumes like alfalfa, soy beans, and cowpeas, go into silos on farms in the Northeastern states nowadays, where only chopped-up cornstalks went before. This one change in farm practice will be of incalculable help in the national campaign to check ruinous soil erosion.

For grass and the legumes are reckoned as soil-conserving crops, whereas corn, green goldmine though it is, must be counted as a soil-destroying crop because the clean cultivation it requires exposes loose soil to the action of running water.

Silos are indispensable in dairy farming, and highly desirable in the feeding of other kinds of livestock, because the slightly fermented, sauerkraut-like green fodder stored in them is not only highly nutritious but rich in vitamins. The fermentation keeps out undesirable kinds of microorganisms in much the same manner that sour-milk bacilli keep out putrefactive bacteria in the making of acidophilous milk and similar fermented health drinks.

Hitherto, corn and a few similar plants have been the only practicable materials for ensilage, because grasses and legumes do not contain enough

Books

SCIENCE NEWS LETTER will obtain for you any American book or magazine in print. Send check or money order to cover regular retail price ($5 if price is unknown, change to be remitted) and we will pay postage in the United States. When publications are free, send 10c for handling.

Address Book Department

SCIENCE NEWS LETTER
2101 Constitution Ave. Washington, D. C.

sugar to promote this desirable fermentation.

This difficulty is overcome in the new grass-and-legume type of silage by adding cheap molasses while the silo is being filled. The molasses is not only ideal stuff for the fermentation bacteria to work on but it adds energy-food value and desirable mineral salts for the livestock. Incidentally, it also adds to the cash revenue of the cane-raising regions, making them better markets for Northern products.

Grass silage and corn silage can be stored in the same silo, experience has shown. It will therefore be possible to withdraw erosion-threatened steep-sloping lands from corn, plant them in protective grass or legumes, and still make a combined profitable use of the whole product of the same fields.

Science News Letter, May 14, 1938

PHOTOGRAPHY—ENGINEERING

Multiplane Camera Developed To Give Depth Illusion

A SPECIAL multiplane camera, making photographs of drawings at different distances from the camera, has been devised for use in the production of cartoon motion pictures that give the illusion of depth, it was reported to the Society of Motion Picture Engineers.

W. E. Garity of Walt Disney Productions described the camera, only one of many pieces of equipment that have been devised in recent years to enable the manufacture of realistic cartoon movies. Use of the new camera gives the motion pictures the vitality that comes with having depth in the drawings.

Cartoon pictures made under the old technique, in which the animated character moved across a background in the same plane, did not adequately give the illusion of real-life movement, Mr. Garity explained. Consequently, the camera which simultaneously photographs the drawing of the character and of a background drawing at a distance from the figure was developed. Its operation, he declared, is quite complex, requiring a detailed control sheet and a special periscope finder with which the operator can check before taking the picture.

"The results in giving increased power to animated motion pictures have been very satisfactory," he concluded.

Two new electrical devices that help to take the guesswork out of determining whether a given sound is the correct one were reported to the meeting.

One shows when a speaker's voice is too low or too strong or if it is just right. The other, which may be used in testing a singer's voice or in tuning a musical instrument, indicates whether the note being tested is just right or sharp or flat.

Described by S. K. Wolf, S. J. Begun and L. B. Holmes of Acoustic Consultants, Inc., both devices use cathode ray tubes as the indicators.

The sound level indicator consists of three portions, one fluorescing blue, the center portion green and the upper portion red. If the speaker's voice is too low the electric signal it controls will be too low and the blue portion of the tube will light up. If the voice is just right, the green portion glows, and if too strong, the red portion is illuminated.

The tuner links a cathode ray tube and twelve electrically-controlled tuning forks, one for each note in the scale. The device compares the note being tested with the standard notes, a wave pattern on the screen of the cathode ray tube moving to one side if the note is high or sharp, to the other side if it is flat.

Sound Recorded by Color

A unique sound recording system taking advantage of the fact that the sensitivity of certain types of film to light of different color or wavelength varies with the change in wavelength was described by A. L. Williams of the Brush Development Company of Cleveland.

Sound is normally recorded by converting it into electrical energy which in turn controls an electric light focused on the film sound track. Mr. Williams' method changes the color of the light in accordance with the sound; the different colors are recorded with widely different sensitivity by the film in accordance with the change in color, thus producing an accurate record of the sound.

Science News Letter, May 14, 1938

CHEMISTRY

First Case of Color Change Heavy Hydrogen Reaction

THE FIRST recorded case where the substitution of heavy hydrogen, or deuterium, for ordinary hydrogen in a chemical reaction produced a color change, is reported (*Journal of Chemical Physics*, May) by Prof. Victor K. LaMer and Samuel H. Maron of Columbia University whose color-change experiments are still in progress.

It is well known that the substitution of a deuterium atom (D) for hydrogen atoms (H) in chemical compounds produces a material with different physical characteristics but, until the LaMer-Maron experiments, this change was never observable to the senses.

In the Columbia tests the change from hydrogen to deuterium atoms produced a light yellow color in a previously clear solution. The chemicals involved in the tests were a solution of proto-nitroethane in heavy water and a compound made of barium, oxygen and deuterium.

Science News Letter, May 14, 1938

●RADIO

May 19, 3:00 p. m., E.S.T.

LOST ARTS OF THE STONE AGE—Dr. H. C. Shetrone, Director of the Ohio State Museum.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

ZERO TO EIGHTY

by Dr. E. F. Northrup

The Inventions and Reflections of an Eminent Scientist. Explaining—Life from 1920 to 2000 A.D.—Future Space Ships — Possibility of Interplanetary Travel — Electric Gun of Tomorrow.

ENDORSED by Scientists and Writers such as: G. W. PIERCE, *Professor of Physics at Harvard University*; WILLIS R. WHITNEY, *Vice President in charge of General Electric Co. Research*; HENRY NORRIS RUSSELL, *of Princeton University, former President American Astronomical Society*; BRADLEY STOUGHTON, *Professor in charge Metallurgical Engineering, Lehigh University*; COLIN G. FINK, *Head Electrochemistry Division, Columbia University*; CAPTAIN S. L. CONNER, *U. S. Army Ordnance Dept.*

Illustrated, Cloth, $3.00

THE SCIENTIFIC PUBLISHING CO.
44 Park Place Princeton, N. J.

•First Glances at New Books

Additional Reviews On Page 324

Population

POPULATION PRESSURE AND ECONOMIC LIFE IN JAPAN—Ryoichi Ishii—*Univ. of Chicago Press,* 259 p., $3. Because of present conditions in the Orient, affecting as they must the entire world, the subject of this volume is of immense general interest. The high Japanese birthrate and the lack of desire among the Japanese for migration make the population problem a serious one.

Science News Letter, May 14, 1938

Geology

GEOLOGY AND MINERAL DEPOSITS OF THE SNOWMASS MOUNTAIN AREA, GUNNISON COUNTY, COLORADO—John W. Vanderwilt—*Govt. Print. Off.,* 184 p., illus., maps, $1. Geol. Survey Bull. 884. This report, written with a minimum of technical jargon and beautifully illustrated, is a valuable source of information about the wildly beautiful marble producing Snowmass Mountain area, for anyone interested in geology, mountaineering, or technical illustration.

Science News Letter, May 14, 1938

Physics

OUR PHYSICAL WORLD—Charles F. Eckels, Chalmer B. Shaver and Bailey W. Howard—*Sanborn,* 801 p., $2.20. A textbook for high school students based not on the conventional outline-of-subject-matter-to-be-taught principle of education, but rather upon the integrated viewpoint-of-the-whole method that has received greater emphasis during recent years. It is therefore an interpretive book. The preface is written by L. Thomas Hopkins of Columbia University's Teachers College, where much of the new educational viewpoint has originated.

Science News Letter, May 14, 1938

Engineering

A STORY OF WATER—Augustus Pigman—*Appleton-Century,* 151 p., $1.50. Here is the story of water in the life of everyday man through all the ages. Primarily it is intended for school children, but their parents, too, will find it interesting.

Science News Letter, May 14, 1938

Agriculture—Economics

BIBLIOGRAPHY ON LAND UTILIZATION, 1918-36—Comp. by Louise O. Bercaw and Annie M. Hannay under the direction of Mary G. Lacy—*Govt. Print. Off.,* 1508 p., $1.50. U. S. Dept. of Agr. Misc. Pub. No. 284. Every one of the 7,343 items in this bibliography has been carefully selected and competently annotated; it is not merely a list of references. Arranged geographically, more than half of the list covers land utilization in the United States, the balance, Africa to Yugoslavia. The author and subject index covers 218 pages. It is an invaluable aid to workers in economics, geography, agriculture and many other fields.

Science News Letter, May 14, 1938

Anthropology—Fiction

EASTWARD SWEEPS THE CURRENT: A SAGA OF THE POLYNESIAN SEAFARERS—Alida Sims Malkus—*Winston,* 394 p., $2. An exciting, Tarzan-like tale of Samoan natives who set out, long ago, on a seafaring adventure and found themselves at length in the land of the Incas, on the Peruvian coast. The author has based her fiction story on the archaeological theory that such voyages to America may indeed have occurred occasionally.

Science News Letter, May 14, 1938

Photography

THE HISTORY OF MOTION PICTURES—Maurice Bardèche and Robert Brasillach—*Norton and Museum of Modern Art,* 412 p., $4. An authoritative work giving the history of the growth of motion pictures as an art. Very little emphasis is placed on the technique of producing motion pictures.

Science News Letter, May 14, 1938

General Science

THE COLORADO MUSEUM OF NATURAL HISTORY: AN HISTORICAL SKETCH—Charles H. Hanington—*The Colorado Museum of Natural History,* 48 p., illus., 25 c.

Science News Letter, May 14, 1938

Biology

BIOLOGY FOR LIFE—Harold U. Cope and Edwin Lincoln Moseley—*College Entrance Book Co.,* 312 p., 96 c. Announced as a workbook and laboratory manual for use with any biology textbook.

Science News Letter, May 14, 1938

Agriculture

BIO-DYNAMIC FARMING AND GARDENING—Ehrenfried Pfeiffer—*Anthroposophic Press,* 22-p., $2.25. The farming system proposed by the author stresses the use of organic fertilizers and hand cultivation. He is opposed to farm mechanization and claims that foods produced on mineral-fertilized soil are of inferior quality.

Science News Letter, May 14, 1938

Psychology

PSYCHOLOGY AND RELIGION—Carl Gustav Jung—*Yale Univ. Press.,* 131 p., $2. The psychological studies of Dr. Jung led him to believe that religion is a natural force in man which can not be denied. This collection of lectures is not technical and can be read with interest by the layman as well as the psychologist.

Science News Letter, May 14, 1938

Fiction, Juvenile

JACQUES THE GOATHERD—Maribelle Cormack and William P. Alexander—*Appleton-Century,* 224 p., $2. Life in the Alps, made very real and vivid by incarnation in the person of a boy tending his herd of goats, to whom come, besides the regular tasks of daily life, a share of dangerous and thrilling adventures.

Science News Letter, May 14, 1938

Horticulture

THE NORTHERN GARDEN—Daisy T. Abbott—*Univ. of Minnesota Press,* 94 p., 75 c. Month-by-month advice for garden planning and making, in chatty, casual style, kept down to pamphlet size.

Science News Letter, May 14, 1938

Natural History—Sports

THE BOY SCOUTS BOOK OF OUTDOOR HOBBIES—Franklin K. Mathiews, ed.—*Appleton-Century,* 248 p., $2.50. Sports, woodcraft, natural history, gadgets—all the fascinating things that healthy boys like and that scouting enables them to do, condensed into one interesting, easy-to-read book, by the Chief Scout Librarian, B. S. A.

Science News Letter, May 14, 1938

Botany

FOREST PATHOLOGY—John Shaw Boyce—*McGraw-Hill,* 600 p., $5. Usable as either text or reference book, this volume gets an astonishing amount of information into a moderate bulk. It arranges its treatment morphologically: diseases of roots, stems, leaves, seedlings, etc. Diseases of timber as well as those of living trees are discussed.

Science News Letter, May 14, 1938

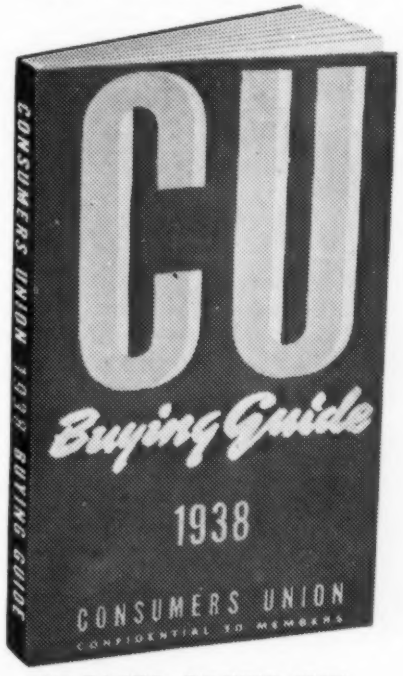
Language

SECOND INTERLINEAR GERMAN READER—Meno Spann—*Univ. of North Carolina Press,* 120 p., 75 c. A simple but lively text, mostly narrative, with literal translations interlined in small type. It should prove a most effective teaching method.

Science News Letter, May 14, 1938

SAVE MONEY on Shoes, Coffee, Razor Blades, Canned Foods, Breakfast Cereals, Tires, Cosmetics, Soaps, Radios

—and dozens of other every-day purchases by using Consumers Union's 1938 Buying Guide in your shopping. This Guide, just off the press, gives you ratings by brand name of over 2,000 brands of products as "Best Buys," "Also Acceptable," and "Not Acceptable" based on expert technicians' tests.



288 PAGES—POCKET SIZE

One Item Alone May Save You Over $60!

A VACUUM CLEANER selling for $21.95 ranked high in cleaning ability and all round value in laboratory test of 18 models of vacuum cleaners reported upon in Consumers Union's 1938 *Buying Guide*. Another model, selling for $89.50 was below average in cleaning ability and was rated "Not Acceptable." If you were going to buy a vacuum cleaner you would save over $60 by buying the first model. Several brands of razor blades selling at 2c apiece were found to shave as well as, if not better than other brands retailing for 5c or more. By buying the 2c blades instead of the 5c blades you would save 3c on each blade. A famous brand of coffee selling at 30c a pound was found to be much inferior in quality to another brand selling at 21c a pound in tests of 36 brands. By changing from the first brand to the second you'd save 9c on each pound of coffee.

Hundreds of similar examples, whereby you can save from as little as 2c on a single purchase to as much as $300 a year and over on your aggregate purchases, can be found in Consumers Union's 1938 *Buying Guide*. This *Guide* tells you which brands of shoes will give you the longest wear for your money. It compares the Ford with the Plymouth and the Chevrolet and tells you which one automotive experts consider the best buy. It gives you photographic experts' ratings of the Leica, the Contax and dozens of other cameras. It tells you which drugs and medicines are dangerous to use and which are safe. Here are just a few of the many products which are rated as "Best Buys," "Also Acceptable," and "Not Acceptable" in this 288-page *Guide*:—

Shoes	**Tires**	**Refrigerators**	**Light Bulbs**
Canned Foods	**Cosmetics**	**Medicines**	**Men's Suits**
Soaps	**Stockings**	**Wines and Liquors**	**House Paints**
Gasolines	**Radios**	**Autos**	**Fountain Pens**

FREE with membership in Consumers Union

Consumers Union's *Buying Guide* is *not* for sale. It is a *confidential* publication intended solely for members of Consumers Union of United States. But you can obtain this *Guide at no extra charge* by joining Consumers Union. The annual membership fee in this nation-wide, pro-labor, non-profit organization is only $3 a year. This fee brings you 12 issues of *Consumers Union Reports* (for description of current issue see box at right), the monthly magazine which reports on all kinds of consumer goods and services (including insurance, home building, hygiene, etc.). And it brings you *at no added cost* this indispensable *Buying Guide*, telling you quickly and *specifically* which brands are good buys and which are "Not Acceptable."

If you prefer *unbiased* technical analyses of the things you buy to the ballyhoo of advertising copy writers, if you demand more fact and less fiction in your buying transactions, above all, if you want to make real, substantial savings on your purchases, join Consumers Union today by filling out and mailing the coupon.

IN THE CURRENT ISSUE OF *CONSUMERS UNION REPORTS*

It is estimated that 50% of the retail mattress business is fraudulent. In a report in the current issue of *Consumers Union Reports*, deceptions practised in the mattress business are exposed and ratings are given of leading brands of mattresses. Other reports give test results on radio aerials, tuna fish, electric ranges, heating pads and other products. Serialized reports on life insurance and home building are also continued. This issue, together with the 1938 *Guide*, will be sent to you upon receipt of the coupon below. Subscription to the *Reports* can be started with any of the issues listed in the coupon.

Subscription to the REPORTS can be started with any of the issues listed below. Please check the issue or issues wanted.

- ☐ **Nov.** — Life Insurance, Men's Hats, Portable Typewriters, Anti-Freezes.
- ☐ **Dec.**—Radios, Cigars, Life Insurance, Canned Salmon, Lipsticks, Electric Shavers.
- ☐ **Jan.**—Lisle Stockings, Life Insurance, Vitamins, Men's Underwear, Home Building.
- ☐ **Feb.**—Ratings of 1938 Autos, Life Insurance, Vitamins, Home Building.
- ☐ **Mar.** — Coffee, Razor Blades, Hair Removers, Insurance, Women's Shorts, Home Building.
- ☐ **Apr.** — Mattresses, Tuna Fish, Chain Store Workers, Electric Ranges, Radio Aerials.

To: CONSUMERS UNION of U. S., Inc.
55 Vandam Street, New York, N. Y.

Send me the 1938 BUYING GUIDE and CONSUMERS UNION REPORTS for one year (12 issues) starting with the issue checked at left. I enclose $3 for membership, $2.50 of which is for subscription. I agree to keep confidential all material sent to me which is so designated.

Name .....

Street .....

City .....

Occupation 5L8

•First Glances at New Books

Additional Reviews On Page 322

Photography

BRILLIANCE, — GRADATION — SHARPNESS, WITH THE MINIATURE CAMERA—Harry Champlin—*Camera Craft,* 160 p., $2. This is a small book crammed with technical information written in clear, non-technical language. It is practical, and should appeal particularly to the amateur who is doing his own developing and printing.

Science News Letter, May 14, 1938

Physiology

THE FOUNDATIONS OF NUTRITION (3rd ed.)—Mary Swartz Rose—*Macmillan,* 625 p., illus., $3.50. This authoritative text is not too technical to be read with profit by intelligent laymen. Colored illustrations add to this third edition.

Science News Letter, May 14, 1938

Biology

EMBRYONIC MOTILITY AND SENSITIVITY—W. Preyer; Trans. by G. E. Coghill and Wolfram K. Legner.—*Soc. for Research in Child Development,* 115 p., $1.

Science News Letter, May 14, 1938

Archaeology

PREHISTORIC ANTIQUITIES OF INDIANA—Eli Lilly — *Indiana Historical Society,* 293 p., plates, $5. Beautiful photography and an attractive volume first impress the reader. The text, with its well-written introduction on American prehistory, advances into more technical descriptions of mounds and relics of Indiana's Indian days. As a way of introducing readers to archaeology of a state, this would seem very successful.

Science News Letter, May 14, 1938

Zoology

FAUNAL RELATIONSHIPS AND GEOGRAPHIC DISTRIBUTION OF MAMMALS IN SONORA, MEXICO—William Henry Burt—*Univ. of Mich. Press,* 77 p., maps, 75 c.

Science News Letter, May 14, 1938

Biology

THE TREE SNAILS OF THE GENUS COCHLOSTYLA OF MINDORO PROVINCE, PHILIPPINE ISLANDS—Paul Bartsch—*Govt. Print. Off.,* 160 p., 26 plates, 35 c.

Science News Letter, May 14, 1938

General Science

THE CIVIC VALUE OF MUSEUMS—T. R. Adam—*American Association for Adult Education,* 114 p., 75 c. Discusses the educational values, for adults, in the museums of a city. There are some thought-provoking remarks in this book, for example: "Effective educational guidance will never be achieved by any museum until the reception given to visitors corresponds to some extent with the purposes that led them to its halls."

Science News Letter, May 14, 1938

Engineering

DIESEL HAND BOOK, 5th ed.—Julius Rosbloom—*Diesel Eng. Inst.,* 720 p., $5. A new, enlarged edition of a standard work for the Diesel engineer. It deals with Diesel engineering for land, marine, automotive, locomotive, aeronautical and portable installations.

Science News Letter, May 14, 1938

Radio

TELEVISION RECEPTION TECHNIQUE—Paul D. Tyers—*Pitman Pub. Corp.,* 144 p. $4. A discussion of the problem from the radio engineer's viewpoint. The theory and practice of television receivers, including a number of tested circuits, is covered.

Science News Letter, May 14, 1938

Agriculture

WE FARM FOR A HOBBY—AND MAKE IT PAY—Henry Tetlow—*Morrow,* 200 p., $2. This almost makes one wish to go out into the country and with the help of spare time and a hired man till the soil and reap the riches thereof.

Science News Letter, May 14, 1938

Historical Fiction

ROOM TO SWING A CAT: Being Some Tales of the Old Navy—Frederick J. Bell—*Longmans, Green,* 274 p., $3. A stirring picture of the days of the old frigates; of customs and superstitions of sailors, duels, sea battles, and incidents of everyday routine depicted vividly.

Science News Letter, May 14, 1938

Psychiatry

A BIOLOGICAL APPROACH TO THE PROBLEM OF ABNORMAL BEHAVIOR—Milton Harrington—*Science Press,* 459 p., $4. The author in seeking the psychological principles underlying mental disorder, found the psychoanalytic approach unsatisfactory. Here he offers a substitute. Dr. Harrington is psychiatrist for the Institution for Male Defective Delinquents, Naponoch, N. Y.

Science News Letter, May 14, 1938

Engineering

LOCATION OF AUTOMOTIVE DIESEL TROUBLES MADE EASY—*Henley,* chart, 50 c. Large scale chart showing the causes of various mechanical troubles, their location and their remedy.

Science News Letter, May 14, 1938

Meteorology

MOUNT WASHINGTON OBSERVATORY NEWS BULLETIN—*Mount Washington Observatory, Gorham, N. H.,* $1 per year. A new publication, unpretentious in size and format, but packed with interesting information about the study of weather at one of the "weatheriest" spots in the world—the new observatory on top of Mount Washington in New Hampshire, where the Arctic comes south to spend the winter in the middle latitudes. Scientific material alternates with chatty personal news.

Science News Letter, May 14, 1938

Geology

THE STORY OF EARTHQUAKES AND VOLCANOES—Gaylord Johnson—*Julian Messner,* 144 p., $2. Some processes of dynamic geology, graphically described for younger readers in language simple yet without annoying condescension. Diagrams show how fascinating and instructive models can be built to put the whole world into your hand and compress ages into minutes.

Science News Letter, May 14, 1938

Botany

A FIELD KEY TO THE MORE COMMON NON-WOODY VASCULAR PLANTS OF CENTRAL AND NORTHERN MINNESOTA—John B. Moyle—*Burgess,* 63 p., $1. Although without illustrations, this multigraphed local flora will undoubtedly prove useful in the region for which it was designed.

Science News Letter, May 14, 1938

Geology

FUNDAMENTALS OF HISTORICAL GEOLOGY—Carl E. Dutton—*Burgess,* 158 p., $2.90. A multigraphed textbook, illustrated mainly with black-and-white sketches and diagrams, in which usefulness from the teaching approach is particularly stressed.

Science News Letter, May 14, 1938

Eugenics

HEREDITY AND POLITICS—J. B. S. Haldane—*Norton,* 202 p., $2.50. See page 316.

Science News Letter, May 14, 1938

Psychology

THE WISE CHOICE OF TOYS (2d ed.)—Ethel Kawin—*Univ. of Chicago Press,* 154 p., illus., $1.50. This volume is considerably more than a list of approved toys; it contains advice on the supervision of play so that it will contribute to the mental, emotional and social development of the child.

Science News Letter, May 14, 1938